Migration, remittances, poverty and inequality in China: a counterfactual analysis

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Master Thesis

Migration, Remittances, Poverty and Inequality in China: A Counterfactual Analysis

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A thesis submitted in fulfilment of the requirements for the degree of Master

in the

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Migration, Remittances, Poverty and Inequality in China: A Counterfactual Analysis

ABSTRACT

This article explores the impacts of migration and remittances on rural household income in China using cross-section data on rural household in the year 2007. The Heckman selection model is used to eliminate the selection bias and estimate the counterfactual income of migrant-sending household if there were no migration. The paper then goes on to compare the counterfactual income with the observed one and estimate the impact of migration on rural poverty and inequality. Results show that migration and remittances have a positive impact on the average rural household per capita net income. However, those who benefit the most from migration are the middle and upper classes rather than the poorest families, and the Gini coefficient even slightly increases. Besides, we find heterogeneity effects among provinces and the impacts also slightly change when different control groups are taken into consideration. In order to improve the rural household income and decrease poverty and inequality, more attention needs to be paid to the lowest income group and help them take part in internal migration.

KEY WORDS: Migration, Remittances, Counterfactual analysis, Heckman model, Poverty, Inequality

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1 Introduction

From a global perspective, due to the economic development level differences among countries, the relatively more developed regions attract a large number of migrants from the less developed areas with more job vacancies as well as higher labor rewards. Many of the migrant workers transfer some of their income to their families left behind, which makes a direct contribution to increasing family income, reducing poverty and improving the average living condition in the poor areas. According to the latest Migration and Development Brief of World Bank , in the year of 2013, there were around 232 millions migrants working abroad and $550 billions remittances have been sent , among which $414 billions flow into developing countries. This proportion increased by 6.3% compared to the previous year.

As the largest developing country in the world, China received about $60 billions overseas remittances in 2013, ranking the top two remittance-receiving countries. However, China is a large country facing an inter-regional unbalanced economic development. Compared with the international migration, China's internal labor migration plays a more and more important role, especially the rural-to-urban migration, commonly called rural migrants, is a unique phenomenon of China's urban-rural dual economic structure which is currently one of the most important factors in improving the rural households income and should not be ignored . On May 27th, 2013, National Bureau of Statistics released the "Rural-urban Migration Monitoring Survey of 2012" showing that the total number of rural migrants exceed 260 million, which is even more than the sum of the international migrants worldwide. Although there is not an official survey of the total remittances of rural migrants, according to the estimation of Cheng & Xu (2005), in 2005 the total remittances from rural migrants lies between 191 and 330 millions yuan, and will continue to grow. Hu et al (2008, 2013) also estimate that China's current annual remittances from rural migrants are more than 300 billions yuan.

On one hand, rural migrants in China lead to a great number of remittances

every year, which makes a great contribution to improving the living standard of the left-behinds. On the other hand, the estimated Gini index among rural household has increased from 0.23 at the beginning of migration trend to 0.35 during the outbreak period of rural-to-urban migration(Li, 2003; Cai, 2005), which means that there may exist a potential inequality growth in rural China. Yet, how much of the inequality can be explained by migration? What is the real effect of migration and remittances on poverty and inequality in rural China? As far as the international migration is concerned, recent studies tend to show a consistent reduction of migration and remittances on sending areas' poverty, whatever method is used. In contrast, inequality is considered to be different according to recipient countries. McKenzie and Rapoport (2007) explained that the Inter-temporal accumulation of wealth and the continuous expanding of migration networks lead to an inverted U-shaped relationship between inequality and migration in a particular region. In the early period of emigration, although the low income families had high motivation to emigrate, only affluent families could afford the cost of sending family members abroad. In this case, most of the international remittances flowed into rich families, resulting in a more serious inequality situation. With the expanding and development of migration networks, more and more low-income families could send migrants workers to obtain economic assistance and the income gap tended to be narrowed at this stage.

As for China, the above two stages may exist simultaneously in different regions owing to the different economic development levels and inter-regional migration process. Exploring the impact of migration and remittances on rural poverty and inequality will help us have a more profound understanding about the urbanization and social justice in China. In fact, since the reform and opening-up policy was implemented three decades ago, along with the household registration system reform and the new style of urbanization process, there have been a growing number of rural migrants obtaining urban residences, or working and living in urban areas permanently. While in many surveys these people are not considered as rural migrants, their remittances are still important income source of their left-behind family members

and many families will also report this part of remittances as migration income. There is also a kind of rural labor forces who only leave their residence and go out to work for short-term, especially in the more developed eastern China. However, neither of these two categories is included in rural migration groups due to the existing statistical standard although they make a real contribution to the rural family income. Considering that most of the previous studies on rural migration have followed this standard, if the urban residence holders or temporary migrants make a large proportion of the whole sample, the result of remittances on rural household income may be underestimated. Therefore, in this paper we make two separated classifications for the whole sample based on different criteria. After that, we will use the counterfactual analysis method to investigate the impact of migration and remittances on rural poverty and inequality based on these two classifications. Besides, provincial comparative analysis will also be added into this paper in order to draw meaningful conclusions. Specifically, this article will focus on solving the following main problems.

Firstly, definition and classification criteria of household types. Concerning rural migrant, as it is a special concept under the Chinese household registration system, also known as hukou system, there is no internationally-agreed definition. The National Bureau of Statistics defined those who leave their permanent residence for a certain period of time as migrants. This period of time was used as six months in most related literatures as well as the national census of 2000 and 2010 (Demurger & Li, 2013). However, as previously described, there are parts of remittances were ignored due to the definition. What is more, some studies also found that it is more consistent with the fact if groups are distinguished by whether the family have remittances or not instead of emigrants because not all of the migrants transfer money home (Margolis etc., 2013). Considering neither of these two classifications was used in the previous literatures on rural poverty and inequality, we use them both and set two classification criteria at the same time. They are (non)migrants-sending household and (non)remittances-received household respectively.

Secondly, model and variables. Counterfactual analysis is the main analytical method used in this paper, the goal of which is to build up a scenario to estimate the counterfactual income if migrants-sending household did not send migrants. In order to eliminate selection bias we will adopt the two step Heckman model (1979) technically, which will also be described in details in Section 3. Two equations need to be taken into account when using Counterfactual analysis method. One is the selection equation deciding what factors affecting the average household income, the other is outcome equation which determines the factors influencing the migrants-sending decision of the family. Generally, there are many factors affecting both the migration choice and the household income per capita, but the indicators of these two equations are not always the same. For instance, the local immigrant network can significantly affect the decision-making of migrants, but shows no remarkable impact on family revenue. In this paper, these variables will be divided into three categories according to the following criteria: household characteristics, head of household characteristics and control variables including provincial and rural features.

Thirdly, regional comparative analysis by province. China is a country with vast territory and uneven regional development levels, where population movements as well as family income are likely to be affected by the special characteristics of a particular region. For example, coastal provinces in the eastern part such as Zhejiang have always been able to attract rural migrations from the middle and western areas of China with more employment opportunities and a higher wage level. Hence the regional factors are non-negligible and a sub-regional discussion is very necessary. Since our database also supports this analysis, we will not only add dummy variables for provinces to the model, but also discuss the results of provincial comparative analysis.

The rest of this paper is structured as follows. Section 2 sums up literatures dealing with the impacts of migration and remittances on poverty and inequality for the sending regions, both on international migration and internal

migration. Section 3 presents the methodology used to control selection bias and formulate counterfactual scenarios. Section 4 describes the data and descriptive analysis of households and regions. Empirical estimation results follow in section 5. Section 6 concludes.

2 A literature review on the impacts of migration and remittances

2.1 Theoretical foundation of migration impacts

From the theoretical perspective, a main contribution of the migration impacts is made by the new economics of labor migration (NELM), which departs from the individualistic neo-classical theory (Massey et al, 1993). In the NELM models, migration decisions are made by households and considered as useful methods to maximize expected income, minimize risks and loosen constraints associated with variety of market failures, especially in developing countries (Stark 1978, 1985, 1991; Stark & Levhari, 1982; Taylor, 1986, 1999; Taylor & Wyatt 1996). While remittances have no importance in the neo-classical theory, they are considered as one of the motives for migrating and poor migrant-sending households can heavily rely on remittances to move out of poverty.

NELM theorists also argue that the aim of households sending migrant workers abroad is not only to improve family income in absolute terms and to overcome constraints on economic activities in original regions, but also to increase income relative to other households, and reduce deprivation compared with some reference group (Taylor et al, 1996; Taylor, 1999). So the composition of migration groups is likely to affect the inequality in the region of origin. For instance, if the poorest families' income stays the same as

others receive remittances, they will experience greater relative deprivation.

Another important theory discussing migration impacts is the livelihood approaches, which extends household-oriented migration theory of NELM to wider social context, such as village communities and ethnic groups (Bebbington, 1999; Ellis, 2000; McDowell & de Haan, 1997; Scoones, 1998). In this context, migration is seen as a deliberate choice to improve livelihoods. But these two theories have a lot in common. Just as stated by de Haas (2007), both the NELM theory and the livelihood approaches can be integrated if seeing migration as a broader household livelihood strategy to diversify income sources and to overcome poverty. They also share the same idea of the main factors affecting migration activities as two kinds of institutions have a significant impact on migration: migration networks and households' structure and management (De Haan et al., 2000). This is also the theoretical basis of the variables used in the analysis section of this paper.

2.2 Empirical evidences of migration impacts

Most empirical evidences also corroborate the NELM theory and livelihood approaches on that migration is an expression of social bonds with the wish to improve living conditions of the left-behinds, and it is generally a reaction to relative instead of absolute poverty. While lots of studies show significant contribution of migration to the income and welfare of the original areas, it does not necessarily imply that migration will reduce poverty or inequality. One of the most important reasons is that migration is a selective activity and the impacts of migration on poverty and inequality heavily depend on the composition of migrant-sending and remittance-receiving groups.

Compared with the internal migration in China, international migration are always associated with more complicated background except economics gap between different countries, such as geopolitical relations or colonial histories. However, the research structures as well as the analysis methods of impacts

of migration and remittances on poverty and inequality do have much in common, from which we can learn a lot. In this chapter, we demonstrate the literatures on international migration and internal migration in China respectively and compare the results.

2.2.1 Impacts of migration and remittances on poverty

International literatures generally see a significant impact of migration and remittances on poverty reduction for the migrant-sending countries, whatever method is used, wherever the study is implemented. From the overall perspective, Adams and Page (2005) integrated data from 71 low-income countries and found that international migration and remittances significantly reduce poverty in migrant-sending countries and regions. When endogeneity is controlled, their study shows that for low-income countries, the poverty rate decreases by 2.1% with a 10% increase in the number of immigrants. World Economic Outlook (2005) from IMF also shows that poverty rate will decrease by 0.5% when remittances to GDP ratio increased by 2.5%. This result has also been found in some areas (Gupta et al, 2007; Acosta, 2008) or a particular country (Adams, 1989; Brown & Jimenes, 2008; Margolis et al, 2013; Acharya & Leon-Gonzalez; 2013).

Studies looking at the impacts of internal migration in China on poverty, however, lead to different opinions. While most of them hold the idea that migrant workers play positive roles in increasing family income and then reduce poverty of the migrant-sending areas (Liu and Zhang, 2009; Zhu and Luo, 2010; Luo, 2010; Wang, 2013), some evidences show that migration activities have no effect or even negative effects on poverty reduction of the migrant-sending villages (Du, 2005; Fan, 2011). There are two main reasons in explaining this function, one of which accounts for that the loss of rural labor force is unfavorable to the sustainable development of rural economy. Another potential reason lying behind is that migration workers will increase the average rural household income significantly, however, the poorest house-

holds could not benefit from this.

2.2.2 Impacts of migration and remittances on inequality

Unlike the unanimous results of remittances on poverty, studies of how migration and remittances impact inequality show different results, especially when concerning income level of the home country. Some studies found significant impacts of migration in reducing the Gini coefficient (Stark et al, 1986; Taylor, 1992; Taylor &Wyatt, 1996), while others see increased income gap (Milanovic,1987; Adam, 1989) or unobvious impact (Barham & Boucher, 1998; Acosta et al,2008). As already mentioned in the introduction part, a consensus has been reached that inter-temporal accumulation of wealth and the continuous expanding of migration networks lead to an inverted U-shaped relationship between inequality and migration in a particular region (McKenzie and Rapoport, 2007). Therefore, the impacts of migration differ according to remittance-receiving countries as far as inequality is concerned.

The impacts of internal migration in China on inequality vary with different databases and estimation methodologies adopted. By analyzing the database of Chinese Household Income Project Survey (CHIP) 1995 and considering the opportunity cost of rural labor migrant workers, Li (1999) finds that migration can reduce inequality on the whole, but the impacts perform significantly in various provinces. Taking the selectivity of rural migrant workers into account, Zhu and Luo (2010) obtained the conclusion that migration narrows the income gap by using counterfactual analysis method, although their counterfactual analysis does not introduce instrumental variables which affect the selection equation only. The study of Hu (2010) goes further by introducing variables into selection equation and finds that migration increase inequality. But his research is based on one particular area in Hubei province only. While the studies mentioned above are all base on parametric estimation, the non-parametric estimation literatures also show different results (Xing, 2010; Wang, 2013). Unfortunately, even though sub-regional

analysis was used by Li in 1999, there have been few literatures in the past two decades paying special attention to the regional differences.

3 Research Methodology

Remittances from migrants were considered as exogenous variables in the early studies about the effect of migration and remittances on emigration household income, under which assumption the results were always positive. However, this approach overlooks an important point that the possible income those who emigrated could have made to their families if they were employed locally, which is commonly referred to as the opportunity cost. If not taking opportunity cost into account, it will generate an upward bias because of overestimating the contribution of remittances. To solve this problem, researchers have gradually begun using counterfactual estimation method.

One of the earliest counterfactual analyses was undertaken by Adam (1989) on analyzing the remittances effect in Egypt. In the first stage, he obtained all the coefficients using the data of non-migration households only. Then he transposed these coefficients into household with migrants in order to get the estimated counterfactual income value through which the real value can be compared with for analysis. The study for Philippines (Rodriguez, 1998) and China (Li, 1999) all followed this method. Yet, this method has a basic assumption that the contribution of migrants and local employees are the same, which is, however, not fitting the real scenario. As documented in the NELM theory and the livelihood approaches, migration is a self-selection activity affected by a lot of factors such as individual characteristics, family preference, and even the local policy. So the ordinary least squares method will lead to an incorrect estimation. Considering of this selection bias, Heckman model (1979) has already been used in some researches (Acosta et al, 2008; Hu, 2010; Wang, 2013; Margolis et al, 2013). Heckman Selection Model

takes the selection effects to the outcome into consideration, and helps us to predict the value of explained variable of unselected sample efficiently. In this paper, we also adopt this empirical methodology, following Margolis et als parametric analysis structure on the migration impacts in Algeria (2013).

3.1 Heckman Model

The well-known Heckman Model was developed by James Heckman between 1976 and 1979. This model now is widely used in econometrics for solving the problem of selection bias.

Firstly, Let's look at the following basic selection equation:

$$\begin{aligned} z_i^* &= \omega_i\gamma + u_i \\ z_i &= \begin{cases} 1 & \text{if } z_i^* > 0 \\ 0 & \text{if } z_i^* \leq 0 \end{cases} \end{aligned}$$

and the following basic outcome equation:

$$y_i = \begin{cases} x_i\beta + \epsilon_i & \text{if } z_i^* > 0 \\ - & \text{if } z_i^* \leq 0 \end{cases}$$

Instead of the uncorrelated assumption between the error terms u_i and ϵ_i, we now suppose they are correlated. Then our least square estimation of the parameter β would not be un-biased any more. We call this bias of β the "Selection Bias". Under this condition, we usually assume that the two error terms satisfy the following relationship:

$$\begin{aligned} u_i &= \mathcal{N}(0,1) \\ \epsilon_i &= \mathcal{N}(0,\sigma^2) \\ corr(u_i,\epsilon_i) &= \rho \end{aligned}$$

Based on the above basic settings, we have:

$$\begin{aligned} E[y_i|y_i \text{ is observed}] &= E[y_i|z_i^* > 0] \\ &= x_i\beta + E[\epsilon_i|u_i > -\omega_i\gamma] \end{aligned}$$

If the error term ϵ_i and u_i are independent, then the last term of the above equation can be written as:

$$E[\epsilon_i | u_i > -\omega_i \gamma] = 0$$

In this way, we can obtain an unbiased and consistent estimation of β by the Ordinary Least Square regression of y_i on x_i. However, any correlation between the error terms means that the truncated mean is no longer $x_i\beta$ and we need to take account of the selection.Thus, we need to obtain $E[\epsilon_i | u_i > -\omega_i \gamma]$ when u_i and ϵ_i are correlated. As Greene(2003) notes:

$$\begin{aligned} E[\epsilon_i | u_i > -\omega_i \gamma] &= \rho \sigma_\epsilon \lambda_i(\alpha_u) \\ \text{where} \quad \alpha_u &= \frac{-\omega_i \gamma}{\sigma_u} \\ \lambda(\alpha_u) &= \frac{\phi(\frac{\omega_i \gamma}{\sigma_u})}{\Phi(\frac{\omega_i \gamma}{\sigma_u})} \end{aligned}$$

where $\lambda(\alpha_u)$ is called the Inverse Mills Ratio of u. Thus, we have:

$$\begin{aligned} y_i | z_i^* > 0 &= E[y_i | z_i^* > 0] + \nu_i \\ &= x_i\beta + \beta_\lambda \lambda_i(\alpha_u) + \nu_i \end{aligned}$$

The above equations clearly illustrate that the OLS estimation of β is biased and inconsistent, because $\beta_\lambda \lambda_i(\alpha_u)$ is omitted. Also, even if $\beta_\lambda \lambda_i(\alpha_u)$ is included in the model, the OLS estimator would still be inefficient since ν_i is heteroskedastic.

3.2 Counterfactual framework and model discription

First of all, We assume that the per capita income equation of the non migrant-sending household satisfies:

$$log(\mathcal{I}_i) = \alpha + \beta \mathcal{F}_i + \gamma \mathcal{H}_i + \theta \mathcal{C}_i + \epsilon_i$$

Secondly, we assume that the selection equation for the migrant-sending is:

$$\begin{aligned} \mathcal{M}_i^* &= \alpha + \beta\mathcal{F}_i + \gamma\mathcal{H}_i + \theta\mathcal{C}_i + \eta\mathcal{J}_i + \nu_i \\ \mathcal{M}_i &= \begin{cases} 1 & \text{if } \mathcal{M}_i^* > 0 \\ 0 & \text{if } \mathcal{M}_i^* \leq 0 \end{cases} \end{aligned}$$

Where $\mathcal{M} = 1$ indicates non migrant-sending household, otherwise $\mathcal{M} = 0$. Following the methodology used by Margolis et al (2013), most of the explanatory variables in the outcome equation and the selection equation should be identical, Where $\mathcal{F}$ stands for household characteristics that affect both the household income and migration selection such as the household size; $\mathcal{H}$ are the variables with related to the household head such as gender and age. Considering China is a large country with different development level among areas, we also add other control variables such as location characteristics and migration networks compared with the study of Margolis et al (2013), which are represented by $\mathcal{C}$. ϵ and ν are the error terms, which are assumed to have a standard normal distribution and be independent from all the explanatory variables. The selection equation of the non migrant-sending/remittance-receiving households is however augmented by other variable(s), presented as $\mathcal{J}$, which is linked to migrant-sending decision but does not impact the non migrant-sending/remittance-receiving households' income. Drawing on the theoretical and empirical literatures on the determinants of the household income and migration decision, all the explanatory variables used in their equations are elaborated below.

According to the NELM theory, migration is a risk-sharing behavior of families rather than individual income maximization choice and its direct aim is to improve the general income of households (Stark & Levhari, 1982). In this context, household characteristics $\mathcal{F}$ are basic as well as essential variables in determining both household income and migration decision. In the study of Margolis et al (2013), household characteristics are captured by household size, number of labor forces, the number of children and old people, ownership of farmland and sex of household head. We also capture them with household size, number of labor forces, household farmland occupation in this thesis, and add average education years and self business inside follow-

ing some recent researches on migration determinants in China (Hu, 2010; Demurger, 2012; Wang, 2013). Considering the number of children and old people only shows significance in the selection equation of Margolis et als study (2013) and there are only literatures documenting the left-behind as the social cost of migration(Rapoport & Docquier, 2006, Demurger & Xu, 2013), we remove these two variables from the outcome equation in the paper. Unless the gender diversity of household in Algeria, around 95% of the household gender in China are male, so we account for household head characteristics $\mathcal{H}$ mainly with age and education level because they often play vital roles in the migration decision of their family members.

As household-oriented migration theory of NELM is extended by livelihood approaches to wider social context, such as village communities and ethnic groups (Bebbington, 1999; Ellis, 2000; McDowell & de Haan, 1997; Scoones, 1998), we also use variables concerning a wider level. Since there are scarce ethnic variables in our database, we introduce dummy variables associated with village characteristics $\mathcal{C}$ such as location, terrain and road condition to account for agriculture condition and distance to market which act as push factors on migration. This is consistent with the comparative analysis of two regions in Algeria in Margolis et als study (2013).

Finally, we also concern those factors $\mathcal{J}$ which will significantly affect the selection equation but show little influence on outcome equation. The NELM theory and livelihood approaches have been seeing migration networks as significant variables saving migration cost and triggering migration motives (De Haan et al., 2000). As also highlighted in many empirical literatures, number of boys (Mansuri, 2008; Margolis, 2013) and migration networks (Hu ,2010; Wang, 2013) are often used as key variables to measure the migration decision independent of the family income. Considering most of Chinese households have only one boy maximum due to the one child only Policy, we use the number of children and old people to replace the number of boys as presented above. Migration networks are also adopted in this paper, demonstrated by family migration network and village share of migrants

in 2005, according to the implication of the NELM theory and livelihood approaches respectively.

According to the assumptions above, we can eliminate the selection bias of migrant-sending effect by Heckman Model. In this article, we use the two-step procedure to do the estimation. Then, we plug the variables of migrant-sending household to build the counterfactual income scenario. Thus we can construct the income data as the following table:

Observed	Real household per capita income
Counterfactual	The household capita income of migrants if they don't migrate

By comparing the statistics of these two data groups, we can deduce the conclusion of how the migrant-sending affects the household income effectively.

4 A descriptive analysis of the data

4.1 Data

This paper relies on cross-sectional data from the Rural Household and Community Survey administered by the National Bureau of Statistics of China under the Rural-Urban Migration in China (RUMiC) project in 2008. This survey covers 32195 individuals from 8000 households, in 82 counties of nine provinces including Hebei, Jiangsu, Zhejiang, Anhui, Henan, Hubei, Guangdong, Chongqing and Sichuan. It includes detailed individual information along with household characteristics, and the nine provinces are representative for the eastern, central and western China. Based on the NELM theory assumption that migration is a result of family decision, we restrict our analysis to household level. All the variables used in this paper are weighted by household size.

As mentioned in the introduction, all the observations are classified into two categories respectively. We will compare the characteristics of migrant-sending household and non migrant-sending household, remittance-receiving household and non remittance-receiving household independently, and compare the obtained estimation results of this two classification standards afterwards. Migrant-sending household refers to those households who have labor force(s) working outside their own counties for more than six months, which follows the standard adopted by the latest census(Duan & Sun, 2006) and the academic definition of rural migrants. Remittance-receiving households here in this paper consist of all the households who reported migration income of the total family income, regardless of where the migrants work and how long they leave home. As long as a family member go out to work and get the corresponding income, the household he/she belongs to is regarded as remittance-receiving household. According to this classification standard, there are 4529 non migrant-sending households and 3471 migrant-sending households, 4164 non remittance-receiving households, 3836 remittance-receiving households. See table 1. These numbers imply that there are some rural labor forces who only work out occasionally or in their own counties.

4.2 Summary statistics

Table 1 presents the rural household income by source. There are no significant differences in total income across the various groups of households defined by migration status, especially for the remittance-receiving and non remittance-receiving household. But per capita income shows obvious gap between the non remittance-receiving and remittance-receiving household, and the per capita income of migrant-sending household is 23% lower than the comparison group. A possible explanation for this is that those families having access to higher-returns local economics activities will have less incentive to send migrants, and this is also verified by the less farm income

and more business income characteristics of non migrant-sending household. The composition of household income illustrates farm income as the main source of rural income with a proportion of 34% of the total per capita income. Business income, however, varies with group with larger standard deviation. Interestingly, the average remittances received by non migrant-sending households is 1560 yuan, which confirms our conjecture that there are some migrants only working out occasionally.

Table 1: Household income by source, 2007

	Type of household				
	Migrant-sending		Remittance receiving		
	No	Yes	No	Yes	All
Net income	19734.36	19081.70	19676.58	19206.53	19451.19
	(17769.82)	(13245.84)	(18980.13)	(11858.63)	(15967.55)
Per capita income	5818.30	4475.97	5758.73	4668.35	5235.89
	(4994.38)	(3102.37)	(5279.55)	(2864.70)	(4328.72)
Remittances	1560.34	7323.04	0.00	8468.46	4060.63
	(4279.87)	(8723.00)	(0.00)	(8375.83)	(7178.81)
Farm income	6574.21	6832.29	6763.77	6601.96	6686.18
	(9780.85)	(6991.20)	(10672.45)	(5792.64)	(8681.73)
Business income	3252.80	1259.07	3760.34	897.84	2387.77
	(10459.72)	(6158.50)	(11706.78)	(3534.62)	(8908.47)
# Obs.	4529	3471	4164	3836	8000

Table 2 shows the observed household characteristics which may have impacts on migration choice and family income. Unsurprisingly, migrant-sending

household and non migrant-sending household strongly differ. For one thing, migrant-sending households have more labor forces and less dependent old people, which enhances the possibility of working out. For another, a larger family size and more dependent children tend to associate with heavier family burden which may be eased by working out and making more money. There are also some characteristics different from our empirical knowledge based on previous studies, such as the proportion of male labor force and household farm land. Many studies documented that male labor forces have a positive effect on migration, some of which even use this as instrumental variables in estimating counterfactual income (Mansuri, 2008; Margolis et al, 2013). Male labor force does not show significant differences among groups in this table. We think the one child policy in China should account for this. As for household farmland, migrant-sending households occupying more along with similar farm income documented in table means that non migrant-sending households rely on high efficiency. Besides, migrant-sending household shows slight advantage in average education. The comparison between remittance-receiving household and remittance-receiving household is similar.

Table 2: Household characteristics

	Type of household				
	Migrant-sending		Remittance receiving		
	No	Yes	No	Yes	All
Household size	3.593	4.471	3.634	4.343	3.974
	(1.276)	(1.309)	(1.295)	(1.337)	(1.362)
# Children under 14	0.525	0.572	0.502	0.593	0.546
	(0.733)	(0.757)	(0.725)	(0.761)	(0.744)
# Young dependent	0.769	0.787	0.753	0.802	0.777
	(0.876)	(0.844)	(0.878)	(0.844)	(0.862)
# Labor force	2.173	3.193	2.222	3.043	2.616
	(1.060)	(1.191)	(1.079)	(1.237)	(1.228)
# Old dependent	0.198	0.148	0.198	0.153	0.177
	(0.497)	(0.425)	(0.497)	(0.432)	(0.468)
Male labor force	0.583	0.565	0.592	0.557	0.575
	(0.217)	(0.191)	(0.218)	(0.191)	(0.206)
Average education	7.424	7.727	7.518	7.597	7.557
	(2.046)	(1.634)	(2.064)	(1.665)	(1.882)
Household farmland	4.582	5.482	4.507	5.478	4.973
	(5.404)	(4.334)	(5.579)	(4.196)	(4.988)
# Obs.	4529	3471	4164	3836	8000

Head of a household is considered of playing vital role in family decision,

especially in rural areas of China where people are more influenced by the Confucianism. As presented in Table 3, more than 95% of the household heads are man, while the rate of migrant-sending household is slightly lower. Rural households generally headed by middle-aged men, those households with female heads because husbands are often deceased. The average head of household is 50 years old, with an education a little more than 7 years, which is less than the average education years for every group, indicating older age cohorts tend to be educated less than the younger cohorts.

Table 3: Household head characteristics

	Type of household				
	Migrant-sending		Remittance receiving		
	No	Yes	No	Yes	All
Male	0.960	0.954	0.961	0.953	0.957
	(0.196)	(0.210)	(0.193)	(0.212)	(0.202)
Age	50.197	50.496	50.647	49.979	50.327
	(10.814)	(9.096)	(10.675)	(9.436)	(10.105)
Education	7.233	7.133	7.261	7.113	7.190
	(2.817)	(2.562)	(2.848)	(2.550)	(2.710)
# Obs.	4529	3471	4164	3836	8000

Table 4 reports characteristics of village matched to each household. Types of village are documented as plains villages, hills village and mountains in the questionnaire. As can clearly be seen from the table, the proportion of non migrant-sending households in plains village where it is suitable for agriculture is significantly higher than the migrant-sending households. Besides, those who occupy good road condition show lower motivation to work out, and this is particularly the case for non remittance-receiving household.

According to the NELM theory, migration networks are important pulling out force, partly because the formation of a network reduces migration cost for the later migrants, relatives and friends also have a peer effect on those who want to work out (Li, 2000). The family network displayed in Table 4 stands for families with one more member having migration experience including those who have already returned, which shows great difference among households. This is especially obvious for permanent migration behaviors, represented by migrant-sending households with more than three times of the non migrant-sending ones. Rural migration proportion of the previous year or years are often recognized as core indicators of measuring the village level migration network and they are also commonly used as instrumental variables in empirical analysis. In this paper we use rural migration proportion of 2005 which is also significantly higher for migration-sending and remittance-receiving household.

Table 4: Village characteristics (%)

	Type of household				
	Migrant-sending		Remittance receiving		
	No	Yes	No	Yes	All
Plain village	47.70%	38.60%	48.40%	38.70%	43.80%
Good road condition	76.83%	72.84%	78.15%	71.80%	75.09%
Family Network	27.53%	96.60%	33.74%	83.29%	57.50%
Rural Migrants of 2005	14.05%	19.53%	14.05%	19.53%	16.69%
# Obs.	4529	3471	4164	3836	8000

As mentioned in the introduction, China is a country with vast territory and unequal regional development level, where population movements as well as family income are likely to be affected by the special characteristics of a par-

ticular region. Table 5 and Table 6 demonstrate net household income and per capita household income respectively by province based on the two classification criteria conveying a lot of information. Firstly, Guangdong, Zhejiang and Jiangsu rank the top three for net household income, while Chongqing, Sichuan and Anhui lie at the bottom, and the net household income of all the six provinces except the top three are lower than the average of total sample. Distribution of per capita household net income shows a similar result, which clearly verifies the income gap among different regions. Therefore, in order to ensure the validity of the results, provinces dummy variables should be added to the regression equation. Secondly, there are more remittance-receiving households than migrant-sending households in most provinces, which manifests that a part of the rural households having short-term migrant workers are not being counted as rural household. Thirdly, the migration rate varies with provinces. No matter calculated by which classification criterion, 80% of the surveyed households in Zhejiang provinces have no migration experience, which is understandable because self-employment is popular and local employment opportunities also increase opportunity cost of migration. In contrast, middle and western provinces such as Sichuan, Anhui and Hubei have a higher migrantion rate.

Table 5: Net income by province

	Type of household				
	Migrant-sending		Remittance receiving		
	No	Yes	No	Yes	All
Hebei	16964.79	16168.51	15949.46	18537.59	16788.02
	(12059.40)	(10758.04)	(12295.52)	(10434.95)	(11777.17)
Jiangsu	23992.28	22421.51	24891.48	21219.64	23352.98
	(21427.38)	(15112.07)	(23511.68)	(9929.94)	(19117.73)
Zhejiang	27784.44	24925.60	26751.75	31135.93	27304.15
	(19026.93)	(16052.97)	(18941.96)	(15407.21)	(18584.01)
Anhui	14241.22	15882.86	13483.68	16472.72	15164.18
	(8360.67)	(9190.17)	(7454.62)	(9637.10)	(8869.33)
Henan	15164.65	15839.67	14648.13	16240.71	15415.76
	(13280.09)	(11026.13)	(15710.03)	(7569.19)	(12487.80)
Hubei	16583.12	17534.80	15863.69	17888.61	17131.29
	(9715.84)	(9333.58)	(9332.13)	(9533.00)	(9504.38)
Guangdong	27115.14	30475.46	26674.47	31007.22	28862.51
	(29638.03)	(18551.30)	(29865.06)	(17643.43)	(24551.89)
Chongqing	12792.39	13509.64	9632.03	15154.65	13122.33
	(7083.33)	(6156.06)	(5036.44)	(6678.66)	(6675.87)
Sichuan	13099.52	14012.46	12044.06	14481.27	13581.72
	(7560.36)	(6423.36)	(7597.67)	(6454.12)	(6994.56)
All	19734.36	19081.70	19676.58	19206.53	19451.19
	(17769.82)	(13245.84)	(18980.13)	(11858.63)	(15967.55)

Table 6: Per capita income by province

	Type of household				
	Migrant-sending		Remittance receiving		
	No	Yes	No	Yes	All
Hebei	5081.56	4229.43	4818.19	5047.20	4892.39
	(3542.29)	(3215.10)	(3658.24)	(3105.40)	(3487.26)
Jiangsu	7547.27	5674.71	7700.35	5516.07	6785.14
	(6627.12)	(3718.25)	(6846.21)	(3136.80)	(5700.16)
Zhejiang	8692.71	7057.15	8412.64	8454.68	8417.94
	(6215.14)	(4980.83)	(6229.63)	(4679.28)	(6054.21)
Anhui	4293.92	3655.26	3949.71	3923.28	3934.85
	(2413.92)	(2220.46)	(2256.55)	(2383.49)	(2327.53)
Henan	4089.16	3633.29	4016.34	3815.58	3919.58
	(3593.04)	(2348.18)	(4116.56)	(1716.72)	(3193.58)
Hubei	5151.82	4170.73	4743.67	4492.94	4586.71
	(3294.98)	(2399.69)	(3111.47)	(2687.12)	(2854.27)
Guangdong	5963.97	5953.01	5860.47	6054.14	5958.27
	(5853.23)	(3864.75)	(6166.42)	(3263.89)	(4918.01)
Chongqing	4407.64	3564.53	3343.04	4413.87	4019.81
	(2793.26)	(1795.21)	(2006.31)	(2554.27)	(2421.15)
Sichuan	4180.21	3532.72	3934.54	3781.87	3838.22
	(2287.77)	(1836.34)	(2355.54)	(1910.25)	(2085.94)
All	5818.30	4475.97	5758.73	4668.35	5235.89
	(4994.38)	(3102.37)	(5279.55)	(2864.70)	(4328.72)

5 Estimation Results

5.1 Household income and the migration decision

Table 7 presents the estimated marginal effects of the Heckman selection model for the variables affecting per capita household income (columns one and three) and non migrant-sending decision(columns two and four) with three regional dummy variables(provinces, topography and traffics condition).

$\mathcal{M}$ in the second column stands for the results of estimation for selection equation of non migrant-sending households, so positive coefficient means this variable is a de-motivation factor of emigrating, and vice versa. As can be seen, the share of labor forces and family size are significant negative variables, which means that the higher proportion of household labor or the bigger the family size is, the more likely that this household prefer to send migrant(s). This is consistent with the results of Margolis et al (2013) and many other empirical literatures showing that both factors can reduce the opportunity cost of migration (Winters et al, 2001; Zhao, 2003; Hu, 2010). The average education years, however, is different from the evidence of Margolis et al (2013) that more education will increase the opportunity cost of migration and Zhaos (2003)finding in China that local off-farm work tend to be more attractive to better-educated individuals. Our result shows that the possibility of migration will significantly increase when households have more years of average education. One reason explaining this is the labor market segmentation theory, which emphasize that due to the dual labor market system in China better educated rural migrants can find a job easier in urban China when competed with the urban workers. Surprisingly, household farmland does not show any significance and the sign is quite small. In contrast, self-employment industry shows significantly positive effect, indicating that families with their own business are reluctant to migrate and this verifies the NELM theory that migration is just a diversity of household income.

Moreover, we find that the household head variables showing significant impacts on migration decision: elder heads or more educated heads have higher possibility to make a non migrant-sending decision, partly because they are risk averse and the opportunity cost of migration for them is relative high.

As for the selection equation of the non remittances-receiving households (column four), all the variables have the exactly same sign with the non migrate-sending ones (column two) but the absolute value of every variable is smaller. Considering that this classification standard concerns more about the temporary migrants or migrants near their original areas, this result implies that to some extent temporary or short-distance migration is a more flexible activity which is affected by less restrictions and much easier for people to participate in. Besides this, some variables do not significant or show lower significance under this classification criterion, such as average household education, the age and education of household head, from which we can also suppose that household characteristics, especially household head characteristics only have obvious impacts on permanent or long-distance migration.

The selection equation also confirms the use of all the exclusion restriction variables, all of which are strongly significant no matter what classification method is adopted. As documented in previous studies that the left-behinds play a vital role in rural households migration and returning decisions (Antman, 2012; Demurger & Xu, 2013), our analysis also shows that families with dependent children or elderly people tend to have more resistance of working out. Unsurprisingly, the variables accounting for migration network, both family network and village network (migrants proportion of 2005) is significantly negative, which confirms our previous statistics and the NELM theory that migration networks play a very important role in promoting and attracting migration, mainly because they can reduce migration cost.

The estimation results of outcome equation (column one and three) describe

the importance of certain variables in determining the per capita income of the non migrant-sending or remittances-receiving households. It should be noted that due to the fact that the per capita household income of some families were reported as zero or a negative number which cannot be carried out as log form, in this article all per capita household income of less than 1 are adjusted to 1. Although estimation bias could not be completely avoided, we strive to reduce it. The regression results show that after controlling provinces, topography and traffic condition as dummy variables, most of the explanatory variables show obvious statistical significance for the non migrant-sending households, while none of the household head characteristics is significant for the non remittances-receiving households. Consistent with the conclusion presented in most of the literatures that household net income tends to be higher if they have more capital resources, both physical capital and human capital (Zhao 2003; Acosta et al, 2008; Hu, 2010; Margolis et al, 2013), we find household farmland, family business (which directly reflects the main income sources in non migrant-sending rural households), share of labor forces and the average education level significantly positive on per capita household income. While household head education level almost has no impact, the age of head tends to show an inverted U shape impact on the income of non migrant-sending households just as proved by lots of previous studies (Luong, 2009; Frijters, 2011).

From the estimated results of the Heckman two-step model above, the coefficient of the Inverse Mills ratio for the case with classification criteria of migrant-sending is not significant. While with the criteria of remittances receiving, we can see that the coefficient of the Inverse Mills ratio is -0.106 and significant. Thus, the correlation between ν and ϵ is not 0, which suggests that selection bias is apparent and it would have been incorrect to estimate the income equation for the households by OLS approach. The negative coefficient of the Inverse Mills ratio also leads to a conclusion that OLS would produce downwardly biased estimates.

Table 7: Estimation results of Heckman Model

	Type of household			
	Migrant-sending		Remittance receiving	
	$log(\mathcal{I})$	$\mathcal{M}$	$log(\mathcal{I})$	$\mathcal{M}$
Labor force	0.132*	-0.508***	0.162**	-0.279***
	(0.054)	(0.105)	(0.060)	(0.084)
Average education	0.050***	-0.083***	0.053***	-0.003
	(0.009)	(0.014)	(0.010)	(0.011)
Household size	-0.152***	-0.329***	-0.160***	-0.263***
	(0.012)	(0.021)	(0.014)	(0.017)
Household farmland	0.009***	-0.005	0.008**	-0.004
	(0.003)	(0.004)	(0.003)	(0.004)
Self business	0.307***	0.251***	0.314***	0.361***
	(0.029)	(0.043)	(0.032)	(0.037)
Household head age	0.035***	-0.047**	0.021	-0.003
	(0.010)	(0.017)	(0.011)	(0.015)
Household head education	-0.000	0.045***	-0.003	0.018*
	(0.007)	(0.010)	(0.007)	(0.008)
Square of household head age	-0.036***	0.048**	-0.025*	0.013
	(0.010)	(0.017)	(0.011)	(0.014)
# Yong dependent	-	0.204***	-	0.157***
	-	(0.035)	-	(0.029)
# Old dependent	-	0.169***	-	0.130**
	-	(0.050)	-	(0.042)
Rural migrants of 2005	-	-1.559***	-	-1.383***
	-	(0.173)	-	(0.149)
Family Network	-	-2.221***	-	-1.127***
	-	(0.049)	-	(0.035)
Province	Controlled	Controlled	Controlled	Controlled
Topography	Controlled	Controlled	Controlled	Controlled
Traffic Condition	Controlled	Controlled	Controlled	Controlled
Intercept	7.666***	4.893***	8.106***	1.911***
	(0.264)	(0.452)	(0.294)	(0.375)
Inverse Mills Ratio	0.007		-0.106*	
	(0.029)		(0.045)	
ρ	0.008		-0.116	
σ	0.872		0.916	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.2 Counterfactual analysis on the impacts of migration and remittances

Substituting the coefficients of non migrant-sending/remittances-receiving households outcome equation under control of selection bias into migrant-sending/remittances-receiving households we can estimate the counterfactual income if they had not migrated. The counterfactual income of the whole sample can be obtained when mixing the observed income of non migrant-sending /remittances-receiving households and estimated income of migrant-sending/remittances-receiving households. Table 8 presents the comparison of observed and counterfactual income and the distribution characteristics of them. Counterfactual income obtained by the two classification criteria are lower than the observed income, which implies that if migrant-sending household had not sent migrants they will get less income, namely that rural migrants improved the average household income level. This is particularly the case for remittance-receiving households, indicating that unconventional migrants who were not included in rural migration groups also make potential contributions to improving family income.

Most of the previous studies measured poverty with a particular threshold such as $1.25 or $2 per day. Considering we just have 8000 samples in this paper and they even shrink when counterfactual estimation is conducted because of the lack of some explanatory variables for particular household, poverty rate change by 1 percent level is not sufficient to affirm that migrants increase or reduce poverty. Therefore, we measure the impact of migration and remittance on poverty and inequality by comparing the income on quantile, skewness and Gini coefficient. As reported in Table 8, counterfactual income is slightly higher than observed income at the first quantile, while observed income exceeds counterfactual income at the median and at the 75% quantile the gap turns larger, suggesting that migration has significantly increased the income of middle-income and high-income level households instead of low-income families. Skewness and Gini coefficient reflect the

same trend. What is more, the counterfactual income of remittance-receiving household is lower than migrant-sending household at every quantile, and the difference of Gini coefficient is less obvious under the remittances level. This implies that the role of migration and remittance in improving rural household income is likely to be underestimated when classification criterion is limited to rural migrants who work out occasionally.

We can also see the results intuitionally in the graphs of household income distribution. Firstly, comparing the blue line of observed income of migrant-sending/ remittance-receiving households with black line of non migrant-sending/ remittance-receiving households' income, we can see that the average income of non migrant-sending/ remittance-receiving households is higher than that of migrant-sending/ remittance-receiving households, suggesting that households with lower local income level are more likely to send migrants. The tail of black line is fatter than that of the blue line, also indicating that the non migrant-sending/ remittance-receiving households' incomes are more dispersed and unequal. Secondly, following information is expressed by comparing the red line of the counterfactual income and the blue line: the median of the blue line is higher than that of the red, suggesting migration increase households average income level; the tail of the blue line is fatter suggesting migration increase inequality; the gap of the two lines is wider in the right side than in the left, suggesting migration makes more rich households than poor ones.

To sum up, our results are different from the study of Margolis et al (2013) which states that migration and remittances reduce poverty and inequality in Algeria and many other developing countries. This is no surprise because the migration type, history, destination and selectivity of migration as well as labor market development level of the migrant-receiving areas vary from country to country. The labor market in China is a dual segmentation one so that rural migrants in urban areas have to compete in an absolute different labor market with restrictions. In this circumstance, only those who are well-qualified tend to find high-paid jobs while the low-skilled groups may

have less comparative advantage than in the original rural areas. Besides, as documented in the NELM theory and livelihood approaches, migration is just a household income diversification approach. Following the migration theory of De Haas(2007), we also agree that even though remittances play an increasingly important role in improving livelihoods of the left-behind in developing areas, it would be naive to expect that remittances alone can wipe out poverty and inequality.

Table 8: Counterfactual income

	Type of household			
	Migrant-sending		Remittance receiving	
	Observed	Counterfactual	Observed	Counterfactual
Mean	5236.805	4977.576	5234.217	4813.861
1st-quantile	2776.695	2844.536	2759.324	2832.993
Midian	4185.230	3948.525	4182.207	3791.035
3rd-quantile	6413.523	5733.363	6410.580	5498.297
Skewness	4.866	5.754	4.865	5.895
Gini Coef.	0.360	0.326	0.360	0.337
# Obs.	7989	7989	7977	7977

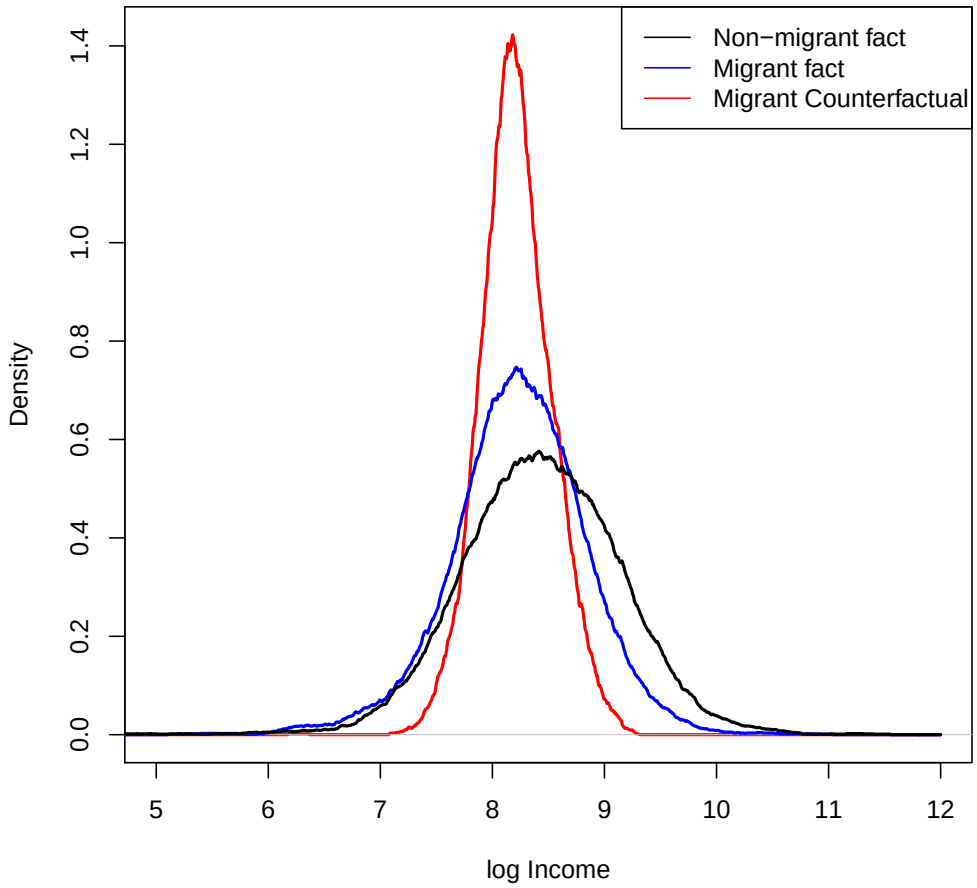

Figure 1: Comparison of households income distribution between families with and without migrants (counterfactual)

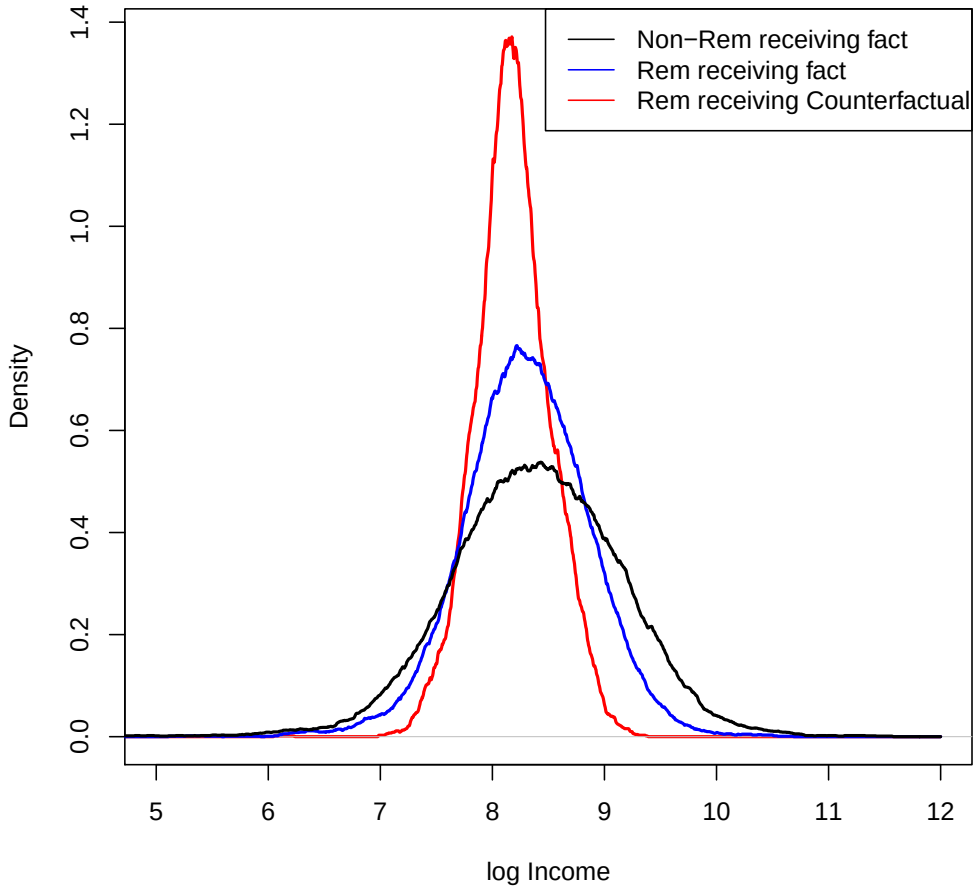

Figure 2: Comparison of households income distribution between families with and without remittances (counterfactual)

5.3 Counterfactual analysis by province

The comparison of counterfactual and observed household income for nine provinces is presented in Table 9 and Table 10, based on the two classification criteria respectively. For analysis simplicity, we only compare income on the

average, the 25% quantile and the median value level. Following characteristics can be found in these two tables. First of all, counterfactual income in all provinces are lower than observed income, suggesting that migration does increase the per capita income of rural households and this impact has been reflected in all the provinces. Secondly, in all provinces except Jiangsu the counterfactual income of remittances-receiving households is lower than the migrant-sending households income, which indicates that taking remittances as the classification criteria will reflect a more practical impact of migration income. Jiangsu is a coastal province with prosperous family business where people are more reluctant to migrate, especially migrate for short-term or short-distance. Thirdly, in the 25% quantile level, observed income of most provinces is lower than the counterfactual income while higher in the median level, implying that migration contributes more to the original higher-income households than these families with lower original income. However, this is not the case for three main floating population provinces: Zhejiang, Guangdong and Sichuan, which send and attract numerous migrants at the same time. Considering the inverted U-shaped theory on the impacts of migration on inequality, we are optimistic about the prospect of migration in reducing poverty as well as inequality in the near future in China.

Table 9: Counterfactual income by province (Migrant-sending)

	Observed	Counter.	Observed	Counter.	Observed	Counter.
	Zhejiang		Jiangsu		Guangdong	
Mean	8424.262	8176.924	6773.412	6615.927	5961.624	4912.519
1st-quartile	4764.742	4860.855	3751.974	4173.156	3390.283	3046.737
Median	7545.33	7102.067	5738.112	5581.542	4942.491	3958.434
	Hebei		Henan		Anhui	
Mean	4892.389	5096.315	3919.578	3853.163	3937.441	3869.158
1st-quartile	2581.988	3078.689	2369.66	2637.229	2343.192	2807.038
Median	3856.315	4466.246	3289.75	3360.739	3423.64	3496.42
	Hubei		Sichuan		Chongqing	
Mean	4586.715	4172.56	3844.922	3710.742	4019.808	3956.128
1st-quartile	2815.935	2928.596	2410.774	2619.478	2489.965	2722.74
Median	3955.765	3613.561	3449.795	3399.309	3467.36	3515.58

Table 10: Counterfactual income by province (Remittance-receiving)

	Observed	Counter.	Observed	Counter.	Observed	Counter.
	Zhejiang		Jiangsu		Guangdong	
Mean	8417.936	8042.915	6771.56	6666.232	5958.273	4877.551
1st-quartile	4759.341	4632.236	3751.974	4095.18	3385.736	2937.026
Median	7542.153	6937.215	5726.48	5613.305	4930.29	3903.518
	Hebei		Henan		Anhui	
Mean	4892.389	5022.397	3911.811	3727.467	3931.335	3686.858
1st-quartile	2581.988	3075.54	2369.545	2560.125	2343.192	2675.643
Median	3856.315	4572.154	3288.077	3279.335	3422.988	3406.722
	Hubei		Sichuan		Chongqing	
Mean	4581.001	3908.622	3833.313	3419.355	4017.461	3349.978
1st-quartile	2813.25	2831.975	2403.205	2376.612	2486.528	2523.686
Median	3947.366	3487.075	3440	3172.989	3466.765	3214.454

6 Conclusion

Ruralurban migration and urban-rural remittances play vital roles in improving the livelihood level of rural households in China. This thesis aimed at revealing the main factors affecting household income and migration decision, as well as exploring the impacts of migration and remittances on poverty and inequality of migrant-sending households. With the data on rural household for the year 2007, I estimated the counterfactual income of migrant-sending households if they had not migrated by using the Heckman model to eliminate selection bias of migration. Then the impacts of migration and remittances on rural poverty and inequality emerged when comparing the counterfactual income with the observed income. The key results of this thesis can be summarized according to the following three aspects.

First of all, migration and remittances have a positive impact on the average rural household per capita net income. However, those who benefit the most from migration are the middle and upper class rather than the poorest families. Comparing with the observed household income, estimated counterfactual income obtained from the Heckman model is lower, which implies that if migrant-sending households had not sent migrants they will get less income, namely that rural migrants improved the average household income level. But when we continue to adopt the quantile analysis, counterfactual income tend to be higher than observed income for households in the low income quantile, while observed income exceeds counterfactual income at the median and higher quantile the gap turns larger, suggesting that migration has significantly increased the income of middle-class and high-class households instead of low-class families, and the Gini coefficient even slightly increases.

Secondly, there are regional heterogeneities of migration on household income. As China is a large country with different development modes among provinces, regional analysis is also included in this paper in order to analyze the heterogeneity effect. Statistics show that coastal provinces like

Zhejiang, Jiangsu and Guangdong have significantly higher household income level than that of the central and western provinces, both for observed and counterfactual income. While the average income levels are significantly improved generally, for most of the provinces, poverty and inequality are unlikely to be reduced by migration. However, the three main floating population and relative developed provinces (Zhejiang, Guangdong and Sichuan) which send and attract numerous migrants at the same time show different evidence that migration and remittances do reduce poverty and income gap to some extent.

Finally, the impacts also slightly change when different control groups are considered. Concerning rural migrant is a special concept under the Chinese household registration system, there is no clear definition of this internationally. Most of studies define those who leave their permanent residence for more than six months as migrants, which neglects some individuals who migrate short-term or short-distance obliviously. In order to unravel and control this bias, two classification criteria are taken into consideration in this paper. Results show that the counterfactual income is lower when remittances-receiving/ non remittances-receiving criterion is adopted, implying that although there is no official migrant in some households, they can also benefit from non-official remittances which are often ignored in most of the previous studies.

From a persistent development perspective, my findings on the impacts of migration also have some interesting implications. McKenzie and Rapoport (2007) explained that the inter-temporal accumulation of wealth and the continuous expanding of migration networks lead to an inverted U-shaped relationship between inequality and migration in a particular region. What this paper shows is that some relative development provinces in China have indeed seen an increased income level as well as decreased income gap. Considering the inverted U-shaped theory on the impacts of migration on inequality, we should be optimistic to the prospect of migration reducing poverty as well as inequality in the near future in China. Besides, short-term or short-distance

migration activities should also be encouraged according to the periodic idle of rural labor and the migration cost tend to be lower in this way. Moreover, as elaborated by De Haas (2007) based on the NELM theory, remittances do play an increasingly important role in securing and actually improving livelihoods of millions of people in developing world, however, it would be naive to expect that remittances alone can solve all development obstacles. We should at least pay more attention to the labor market reform in order to break the segmented dual labor markets in China. Only in this way will migration develop steadily and continuously.

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